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VARIOUS.

IMPROVEMEMT OF CEMENT.

M. Ducournau has proposed a method of improving all kinds of cement and mortar, so as to prevent the cracking of structures built with these materials, and at the same time increase the hardness and resistance. The aggregate incorporated in the cement has for its basis acetic or any other suitable acid, which is used in the liquid or solid state. The liquid aggregate is composed of acetic acid diluted with water, in proportions varying according to the product to be improved. This aggregate is especially employed for the manufacture of artificial stone. The solid aggregate is composed of the following ingredients: —

1. Acetic acid.
2. Powdered flint.
3. Grains of flint, very fine, passing trough the 30 sieve, and remaining on the 50 sieve. In this way a dry powder is obtained, capable of being kept a long time, and always ready for use when wanted.

Moniteur Industriel Belge.

PROCESS FOR HARDENING ZINC.

Messrs. Boignol, Farjon and Delpierre have succeeded in changing the soft pasty character of zinc by pouring into the metal, while in a state of fusion before casting it, a proportion of sal ammoniak, varying from a tenth to a fifth of the zinc, according to the degree of hardness desired.

The metal thus obtained is worked at the lathe and the file, and may, in many cases, serve as a good and cheap substitute for bronze.

Technologiste.

A USEFUL LEVELLING INSTRUMENT.

A new and in many cases very useful levelling instrument has been recommended in the Dresden *Gewerbe-Verein*. It is constructed as follows: — Two glass tubes, standing upright on feet, and open above and below, are connected below with an india-rubber tube of any convenient length. If water is poured into one of the tubes, it will naturally rise to the same height in the other, however uneven the ground may be. When ground is to be levelled, the tubes should be set up at convenient distances, and stakes put into the ground, so as to reach the height of the water level. The more uneven the ground is, the higher the tubes must be; but the inconvenience arising from this may be in some measure alleviated by the use of stones or other supports. The chief advantage of this water level is that levelling may be performed with it even round corners.

The Practical Magazine.

COATING MASONRY WITH IRON.

When they began to use raw iron in America as an outer coating for masonry, it was alleged that the dilatation and contraction would cause a disturbance of the joints, and consequently the speedy destruction of the walls; but experience has since contradicted this. Buildings of this sort, exposed for years to all the inclemency of the atmosphere, are still in very good condition. Docks, filled with very combustible materials, having been set on fire, have perfectly resisted the flames; only the interior masonry has been injured in these cases.

Iron coatings can be conveyed and put on, or taken off, at all seasons with great facility. They take up less room than ordinary materials, and leave more space free for buildings. When the buildings are pulled down, the plates can be taken off and used again.

Raw iron does not rust much in the air, so that there is no fear of damage from that source. A coating of paint from time to time effectually preserves it from rust. It is probable that, as it gets more known by experience, it will replace more expensive materials, such as granite and marble, in many cases.

PREPARATION OF EBONITE.

The use of ebonite, one of the newer preparations of india rubber, is constantly increasing, on account of its better applicability to many purposes in the arts than its near ally, vulcanite. The two substances are quite familiar, being composed of india rubber and sulphur, with some preparation of gutta percha, shellac, asphalte, graphite, etc., although these latter are not essential. In vulcanite the amount of sulphur does not exceed 20 to 30 percent, whereas in ebonite the percentage of sulphur may reach as high as 60. An increased temperature is also required for this preparation. The approved formula consists in mixing together 100 parts of rubber, 45 of sulphur, and 10 of gutta percha, with sufficient heat to facilitate the combination. In manufacture, a sufficient quantity of this mixture is placed in a mould of a desired shape, and of such material as will not be affected by the sulphur contained in the mass. It is then exposed to heat of about 315° Fah. and a pressure of about 12 lbs. to the square inch., for two hours. This is done most readily by placing the mould in a steam pace, where the requisite pressure and temperature can easily be kept up. When cold, the ebonite is removed from the mould, and finished and polished in the usual manner.

Scientific American.

THE MEGALOGRAPH.

This title is given by M. G. Revoil to a new instrument which he has invented for easily reproducing objects on a large scale. The chief merit of the invention consists in the combination of the camera clara with the microscope or telescope. The camera clara, well known to painters, especially landscape painters, is an Italian invention of the celebrated Amici, which chiefly consists in an optical combination by which the eye looks through a prism and sees reproduced on paper below the images of objects that serve to guide the point of the pencil for drawing them.

By the happy combination of such an instrument with those mentioned above, an object may be drawn, however small or distant it may be, because it is seen with the magnitude produced by the microscope or telescope. Hence the naturalist will be able to draw accurately the structure of any microscopic object, and afterwards by substituting the kaleidoscope for the microscope, those varied and simple combinations of forms and colours may be easily reproduced which are sometimes useful to the designer, and occasion most agreeable surprises by the instantaneous transformations that are presented on the slightest movement of the tube.

The Practical Magazine from El Porvenir de la Industria.

TO OBTAIN A BROWN PATINA OF ZINC.

A solution of molybdic acid, or molybdate of ammonia, in very dilute aqua regia, or a solution of molybdic acid in excess of very dilute caustic soda, produces, according to Kletzinsky, a very useful patina bath for articles of cast zinc. Zinc statues or other ornamental articles, when dipped into this bath, become covered with a very pleasing brown patina showing the prismatic colors. This covering is nothing but a thin film of oxide of molybdenum, which exhibits polarization colors and adheres firmly to the metallic zinc.

Scientific American.